LIST OF PREPARERS

This section lists the individuals who contributed to the technical content of this environmental impact statement (EIS). The preparation of the EIS was directed by J. N. Knox and L. T. Ling of the U.S. Department of Energy (DOE) and P. L. Young of Tetra Tech NUS, Inc.

Some of the individuals listed below prepared specific sections in accordance with their technical qualifications. Other technical experts provided input to those sections through in-depth review and data verification. Still others provided overall technical or management reviews for their respective organizations.

NAME: **YVONNE F. ABERNETHY**

AFFILIATION: Tetra Tech NUS, Inc.

EDUCATION: M.S., Forest Management and Economics, 1984
B.S., Forest Management, 1979

TECHNICAL EXPERIENCE: Fifteen years in natural resource management and environmental planning.

EIS RESPONSIBILITY: Document Manager; prepared References sections.

NAME: **CHARLES BORUP**

AFFILIATION: U. S. Department of Energy

EDUCATION: M.S., Forest Management, 1979
B.S., Environmental Planning, 1973

TECHNICAL EXPERIENCE: Eight years preparing NEPA documents; 22 years experience in planning and environmental fields.

EIS RESPONSIBILITY: Contributed to Chapter 3.

NAME: **JANET BOUKNIGHT**

AFFILIATION: Tetra Tech NUS, Inc.

EDUCATION: M.S., Environmental Toxicology, 1998
B.S., Biological Sciences, 1995

TECHNICAL EXPERIENCE: One year experience as an ecotoxicologist.

EIS RESPONSIBILITY: Prepared Transportation portion of Chapter 4.

NAME: **PAT BURKE**

AFFILIATION: U. S. Department of Energy

EDUCATION: B.S., Civil Engineering, 1980

TECHNICAL EXPERIENCE: Five years reviewing NEPA documents; 15 years in civil engineering and 5 years in utility management.

EIS RESPONSIBILITY: Reviewed Chapters 3 and 6.

NAME: **STEVE CONNOR**

AFFILIATION: Tetra Tech NUS, Inc.

EDUCATION: M.S. Physics, 1974
B.S., Physics, 1973

TECHNICAL EXPERIENCE: Twenty-three years experience in environmental management systems, radiological effluent monitoring, analytical laboratory quality assurance, gamma spectrometry, radiological transportation risk assessments, environmental transport, dose assessments, human health risk assessments, and NEPA document preparation.

EIS RESPONSIBILITY: Deputy Project Manager; prepared Appendix A.

NAME: **WILLIAM J. CRAIG**

AFFILIATION: Tetra Tech NUS, Inc.

EDUCATION: M.S., Planning, 1977
B.S., Forestry, 1972

TECHNICAL EXPERIENCE: Twenty years experience in utility fuel planning, and nuclear powerplant siting.

EIS RESPONSIBILITY: Prepared Socioeconomics and Land Use sections of Chapters 3 and 4.

NAME: **KENT T. CUBBAGE**

AFFILIATION: Tetra Tech NUS, Inc.

EDUCATION: M.S., Ecotoxicology, 1993
B.S., Biology, 1991

TECHNICAL EXPERIENCE: Five years experience as an ecotoxicologist.

EIS RESPONSIBILITY: Prepared Long-Term Ecological Resources sections of Chapter 4 and Appendix C.

NAME: **PHILIP C. FULMER, CHP**

AFFILIATION: Tetra Tech NUS, Inc.

EDUCATION: Ph.D., Nuclear Engineering, 1993
M.S., Health Physics, 1990
B.S., Health Physics, 1989

TECHNICAL EXPERIENCE: Ten years experience in radiation protection, internal radiation dosimetry, and external radiation dosimetry.

EIS RESPONSIBILITY: Prepared Long-Term Human Health sections of Chapter 4 and prepared Appendix C.

NAME: **ANDREW R. GRAINGER**

AFFILIATION: U. S. Department of Energy

EDUCATION: M.S., Wildlife Ecology, 1978
B.S., Natural Resources, 1975

TECHNICAL EXPERIENCE: Twelve years preparing NEPA documents; 18 years in terrestrial ecology, facility siting, wetlands ecology, endangered species management.

EIS RESPONSIBILITY: NEPA Compliance Officer; NEPA Specialist for the EIS; DOE-SR reviewer for Draft EIS; contributed to Chapters 1, 2, and 3; prepared the Summary and Appendix D.

NAME: **GARY L. GUNTER**

AFFILIATION: Tetra Tech NUS, Inc.

EDUCATION: B.S., Geology, 1984

TECHNICAL EXPERIENCE: Ten years experience in geology and hydrogeology projects specializing in groundwater assessment and remediation.

EIS RESPONSIBILITY: Prepared Geologic Resources sections of Chapters 3 and 4; prepared Short-Term Groundwater Resources sections of Chapter 4.

NAME: **KATHRYN B. HAUER**

AFFILIATION: Tetra Tech NUS, Inc.

EDUCATION: M.A., English, 1985
B.A., English, 1983

TECHNICAL EXPERIENCE: Eleven years experience in technical writing, editing, and teaching in both government and business disciplines.

EIS RESPONSIBILITY: Technical Editor.

NAME: **BRENDA HAYS**

AFFILIATION: U. S. Department of Energy

EDUCATION: J.D., 1986

TECHNICAL EXPERIENCE: Six years preparing NEPA documents; 11 years experience as attorney.

EIS RESPONSIBILITY: Contributed to Chapter 7; reviewed Draft EIS.

NAME: **ALLAN JENKINS**

AFFILIATION: Tetra Tech NUS, Inc.

EDUCATION: B.S., Geology, 1975
A.S., General Studies, 1972

TECHNICAL EXPERIENCE: Seventeen years experience in engineering geology, hydrogeology, environmental investigations, and remediation of petroleum-contaminated soil and groundwater.

EIS RESPONSIBILITY: Prepared Long-Term Groundwater Resources section of Chapter 4; contributed to Appendix C.

NAME: **RONALD JERNIGAN**

AFFILIATION: U. S. Department of Energy

EDUCATION: B.S., Geography, 1973

TECHNICAL EXPERIENCE: Fourteen years reviewing NEPA documents; 25 years in real estate management.

EIS RESPONSIBILITY: Reviewed Chapters 3 and 6.

NAME: **DOUGLAS E. KENNEMORE**

AFFILIATION: Tetra Tech NUS, Inc.

EDUCATION: M.S., Biology, 1995
B.S., Biology, 1991

TECHNICAL EXPERIENCE: Seven years in botany and plant community investigations.

EIS RESPONSIBILITY: Prepared Cultural Resources section of Chapter 3.

NAME: **JOHN KNOX**

AFFILIATION: U. S. Department of Energy

EDUCATION: M.S., Botany, 1974
B.S., Biology, 1972

TECHNICAL EXPERIENCE: Four years preparing or reviewing NEPA documents; 24 years in environmental analysis and environmental management.

EIS RESPONSIBILITY: Prepared Chapter 1; principal DOE reviewer of Draft EIS; contributed to Chapter 3.

NAME: **LARRY T. LING**

AFFILIATION: U. S. Department of Energy

EDUCATION: B.S., Chemical Engineering, 1982

TECHNICAL EXPERIENCE: Three years preparing or reviewing NEPA documents; over 17 years experience in nuclear facilities and systems.

EIS RESPONSIBILITY: Document Manager; DOE reviewer of Draft EIS; contributed to Chapters 1, 2, and 6, and Appendix A.

NAME: **LISA A. MATIS**

AFFILIATION: Tetra Tech NUS, Inc.

EDUCATION: M.S., Mechanical Engineering, 1989
B.S., Chemical Engineering, 1984

TECHNICAL EXPERIENCE: Fourteen years experience in chemical-environmental engineering.

EIS RESPONSIBILITY: Prepared Waste and Materials sections of Chapters 3 and 4; prepared Utilities and Energy section of Chapter 4; prepared Chapter 7.

NAME: **PHILIP R. MOORE**

AFFILIATION: Tetra Tech NUS, Inc.

EDUCATION: M.S., Wildlife and Fisheries Biology, 1983
B.A., English, 1975

TECHNICAL EXPERIENCE: Seventeen years experience as fishery biologist and aquatic ecologist.

EIS RESPONSIBILITY: Prepared Surface Water and Ecological sections of Chapters 3 and 4.

NAME: **APARAJITA S. MORRISON**

AFFILIATION: Tetra Tech NUS, Inc.

EDUCATION: B.S., Health Physics, 1985

TECHNICAL EXPERIENCE: Eleven years experience in environmental and occupational radiological programs including management of an environmental monitoring laboratory, startup testing of nuclear instrumentation, training, and technical assessments of environmental and radiation protection programs.

EIS RESPONSIBILITY: Prepared Health and Safety sections of Chapters 3 and 4; prepared Chapter 5.

NAME: **JAMES L. OLIVER**

AFFILIATION: Tetra Tech NUS, Inc.

EDUCATION: B.S., Biology (Fisheries), 1971

TECHNICAL EXPERIENCE: Twenty-three years experience in research and impact assessment projects for the U.S. Department of Interior and DOE. Reviews environmental and natural resource management issues and performs strategic planning for National Environmental Policy Act documentation for DOE.

EIS RESPONSIBILITY: Prepared Chapter 6. Management Reviewer.

NAME:	**JOSEPH W. RIVERS**
AFFILIATION:	Jason Associates Corporation
EDUCATION:	B.S., Mechanical Engineering, 1982
TECHNICAL EXPERIENCE:	Three years experience in preparing NEPA documents; 16 years in commercial and DOE nuclear projects; design, systems engineering, safety and accident analysis, and regulatory compliance.
EIS RESPONSIBILITY:	Prepared Accident Analysis section of Chapter 4; prepared Appendix B.

NAME:	**DIANE S. SINKOWSKI**
AFFILIATION:	Tetra Tech NUS, Inc.
EDUCATION:	M.E., Nuclear Engineering, 1994 B.S., Nuclear Engineering Sciences, 1990
TECHNICAL EXPERIENCE:	Six years in air permitting, fate and transport modeling, human health impacts, environmental compliance, and health physics.
EIS RESPONSIBILITY:	Prepared Air Resources sections of Chapters 3 and 4; contributed to Appendix C.

NAME:	**THOMAS TEMPLES**
AFFILIATION:	U. S. Department of Energy
EDUCATION:	Ph.D., Geology, 1996 M.S, Geology, 1978 B.S., Geology, 1976
TECHNICAL EXPERIENCE:	Four years preparing NEPA documents; 18 years as a geophysicist.
EIS RESPONSIBILITY:	Contributed to Chapter 3.

NAME: **ALAN L. TOBLIN**

AFFILIATION: Tetra Tech NUS, Inc.

EDUCATION: M.S., Chemical Engineering, 1970
B.E., Chemical Engineering, 1968

TECHNICAL EXPERIENCE: Twenty-three years experience in analyzing radiological and chemical contaminant transport in water resources.

EIS RESPONSIBILITY: Contributed to Appendix C.

NAME: **PHILIP L. YOUNG, CHP**

AFFILIATION: Tetra Tech NUS, Inc.

EDUCATION: M.S., Health Physics, 1989
B.S., Radiation Health (Health Physics), 1988

TECHNICAL EXPERIENCE: Ten years experience in environmental health physics and environmental impact assessment, with emphasis on radiological effluent monitoring, environmental surveillance, environmental dosimetry, radiological risk assessment, and radioactive waste management.

EIS RESPONSIBILITY: Project Manager; technical reviewer; contributed to Appendix C.

NEPA DISCLOSURE STATEMENT
FOR
PREPARATION OF THE
ENVIRONMENTAL IMPACT STATEMENT FOR CLOSURE OF HIGH-LEVEL WASTE TANKS AT THE SAVANNAH RIVER SITE, SOUTH CAROLINA

CEQ Regulations at 40 CFR 1506.5c, which have been adopted by the DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981, guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 FR 18026-18038 at Question 17a and b.

"Financial or other interest in the outcome of the project" includes "any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients)." See 46 FR 18026-18031.

In accordance with these requirements, the offeror and the proposed subcontractors hereby certify as follows: (check either (a) or (b) and list financial or other interest if (b) is checked).

(a) ☑ Contractor has no financial or other interest in the outcome of the project.

(b) ☐ Offeror and any proposed subcontractor have the following financial or other interest in the outcome of the project and hereby agree to divest themselves of such interest prior to award of this contract.

Financial or Other Interest

1.

2.

3.

Certified by: Daniel M. Evans
Signature

Daniel M. Evans
Name (Printed)

General Manager
Title

Tetra Tech NUS, Inc.
Company

June 10, 1999
Date

DISTRIBUTION LIST

DOE provided copies of the *Savannah River Site, High-Level Waste Tank Closure Draft Environmental Impact Statement* EIS to Federal, state, and local elected and appointed officials and agencies of government; Native American groups; Federal, state, and local environmental and public interest groups; and other organizations and individuals listed below. Copies will be provided to other interested parties upon request as identified in the cover sheet of this EIS.

CONTENT

A. UNITED STATES CONGRESS

A.1 SENATORS FROM AFFECTED AND ADJOINING STATES

The Honorable Max Cleland
United States Senate

The Honorable Ernest F. Hollings
United States Senate

The Honorable Zell Miller
United States Senate

The Honorable Strom Thurmond
United States Senate

A.2 UNITED STATES SENATE COMMITTEES

The Honorable Mary Landrieu
Ranking Minority Member
Subcommittee on Strategic Forces
Committee on Armed Services

The Honorable Harry Reid
Ranking Minority Member
Subcommittee on Energy and Water Development
Committee on Appropriations

The Honorable Robert C. Byrd
Ranking Minority Member
Committee on Appropriations

The Honorable Robert Smith
Chairman
Subcommittee on Strategic Forces
Committee on Armed Services

The Honorable Pete V. Domenici
Chairman
Subcommittee on Energy and Water Development
Committee on Appropriations

The Honorable Ted Stevens
Chairman
Committee on Appropriations

The Honorable Carl Levin
Ranking Minority Member
Committee on Armed Services

The Honorable John Warner
Chairman
Committee on Armed Services

A.3 UNITED STATES HOUSE OF REPRESENTATIVES FROM AFFECTED AND ADJOINING STATES

The Honorable James E. Clyburn
U.S. House of Representatives

The Honorable Charlie Norwood
U.S. House of Representatives

The Honorable Nathan Deal
U.S. House of Representatives

The Honorable Mark Sanford
U.S. House of Representatives

The Honorable Lindsey Graham
U.S. House of Representatives

The Honorable Floyd Spence
U.S. House of Representatives

The Honorable Jack Kingston
U.S. House of Representatives

The Honorable John M. Spratt, Jr.
U.S. House of Representatives

The Honorable Cynthia McKinney
U.S. House of Representatives

A.4 UNITED STATES HOUSE OF REPRESENTATIVES COMMITTEES

The Honorable Peter Visclosky
Ranking Minority Member
Subcommittee on Energy and Water Development
Committee on Appropriations

The Honorable Duncan L. Hunter
Chairman
Subcommittee on Military Procurement
Committee on National Security

The Honorable C. W. Bill Young
Chairman
Committee on Appropriations

The Honorable Ron Packard
Chairman
Subcommittee on Energy and Water Development
Committee on Appropriations

The Honorable David Obey
Ranking Minority Member
Committee on Appropriations
U.S. House of Representatives

The Honorable Norman Sisisky
Ranking Minority Member
Subcommittee on Military Procurement
Committee on National Security

The Honorable Ike Skelton
Ranking Minority Member
Committee on National Security

The Honorable Floyd Spence
Chairman
Committee on National Security

B. FEDERAL AGENCIES

Mr. Roger L. Banks
U.S. Fish and Wildlife Service

Mr. John Bellinger
NEPA Coordinator
Office of Environmental Policy
U.S. Army Corps of Engineers

Major General R. M. Bunker
Division Engineer, South Atlantic Division
U.S. Army Corps of Engineers

Mr. Bill Champion
West Valley Nuclear Services
U.S. Department of Energy

Mr. Douglas H. Chapin
Richland Operations Office
U.S. Department of Energy

Mr. Ken Clark
Region II Public Affairs Officer
U.S. Nuclear Regulatory Commission

Commander, Savannah District
Attn: Planning Division
U.S. Army Corps of Engineers

Mr. Brian Costner
Senior Policy Advisor
Office of the Secretary of Energy

Ms. Marjorie S. Davenport
District Chief
Water Resources Division
U.S. Geological Survey
U.S. Department of Interior

Mr. Paul F. X. Dunigan, Jr.
Richland Operations Office
U.S. Department of Energy

Mr. Robert Fairweather
Chief, Environmental Branch
Office of Management and Budget

Dr. Haus Mark
Assistant Secretary for Nuclear, Chemical and Biological Defense Programs

Mr. Joseph R. Franzmathes
Assistant Regional Administrator, Office of Policy and Management
U.S. Environmental Protection Agency, Region IV

Mr. Don Fontozzi
U.S. Department of State

Mr. Mark Frei (EM-40)
Office of the Deputy Assistant Secretary for Project Completion

Mr. Kenneth W. Holt
Centers for Disease Control and Prevention
National Center for Environmental Health
U.S. Department of Health and Human Services

Mr. Dave Huizenga (EM-20)
Office of Deputy Assistant Secretary for Integration and Disposition
U.S. Department of Energy

Mr. Michael Jansky
WM Hanford
U.S. Department of Energy

Mr. Don L. Klima
Director, Office of Planning & Review
Advisory Council on Historic Prevention

Mr. Andreas Mager, Jr.
Habitat Conservation Division
National Marine Fisheries Service
National Oceanic and Atmospheric Administration
U.S. Department of Commerce

Mr. Jim Melillo
Executive Director
Environmental Management Advisory Board
U.S. Department of Energy

Mr. Heinz Mueller
Office of Environmental Policy & Compliance
U.S. Environmental Protection Agency

Mr. Charles Oravetz
Chief
Protected Species Management Branch
Southeast Regional Office
National Marine Fisheries Service
National Oceanic and Atmospheric Administration
U.S. Department of Commerce

Ms. Cynthia Carpenter
Director
Nuclear Material Safety Safeguards
U.S. Nuclear Regulatory Commission

Mr. Bob Peralta
Chief Council
Argonne National Laboratory
U.S. Department of Energy Laboratory

Mr. Jon Richards
Region IV
U.S. Environmental Protection Agency

Dr. Libby Stull
Argonne National Laboratory
U.S. Department of Energy Laboratory

Mr. Willie R. Taylor
Director
Office of Environmental Policy & Compliance
U.S. Department of Interior

Mr. Andrew Thibadeau
Information Officer
Defense Nuclear Facilities Safety Board

Mr. Greer C. Tidwell
Administrator, US EPA-IV

Mr. Barry Zalcman
Office of Nuclear Reactor Regulation
Nuclear Regulatory Commission

C. STATE OF SOUTH CAROLINA

C.1 STATEWIDE OFFICES AND LEGISLATURE

The Honorable Jim Hodges
Governor of South Carolina

The Honorable Bob Peeler
Lieutenant Governor of South Carolina

The Honorable Charles Condon
Attorney General

The Honorable James E. Smith, Jr.
South Carolina House of Representatives

Ms. Omeaga Burgess
Office of the State Budget

C.2 STATE AND LOCAL AGENCIES AND OFFICIALS

The Honorable Jackie Holman
Mayor of Blackville

Coordinator
Aiken County Civil Defense
Aiken County Emergency Services
Attn: Freddie M. Bell

Mr. Russell Berry
South Carolina Department of Health and Environmental Control

Mr. Frank Brafman
Hilton Head Town Council

Mr. Donnie Cason
South Carolina Department of Highways and Public Transportation

Mr. Keith Collinsworth
Federal Facility Liaison
Environmental Quality Control
South Carolina Department of Health and Environmental Control

Mr. Phil England
Director
Aiken County Planning & Development Department

Mr. G. Kendall Taylor
Division of Hydrogeology
Bureau of Land and Hazardous Waste Management
South Carolina Department of Health and Environmental Control

Mr. David Wilson
Division of Hydrogeology
Bureau of Land and Hazardous Waste Management
South Carolina Department of Health and Environmental Control

D. STATE OF GEORGIA

D.1 STATEWIDE OFFICES AND LEGISLATURE

The Honorable Roy Barnes
Governor of Georgia

The Honorable Mark Taylor
Lieutenant Governor of Georgia

The Honorable Charles W. Walker
Georgia Senate

The Honorable Thurbert Baker
Attorney General

The Honorable Ben L. Harbin
Georgia House of Representatives

E. NATURAL RESOURCE TRUSTEES, SAVANNAH RIVER SITE

Mr. Douglas E. Bryant
Commissioner, SCDHEC
Natural Resource Trustee

Mr. A. B. Gould
Director
Natural Resource Trustee
DOE-SR Environmental Quality Management

Mr. Clarence Ham
SRS Natural Resource Trustee
US Army Corps of Engineers
Charleston District
Department of the Army

Mr. David Holroyd
SRS Natural Resource Trustee
US Environmental Protection Agency Region IV

Mr. Ronald W. Kinney
SRS Natural Resource Trustee
SCDHEC Waste Assessment and Emergency Response

Ms. Denise Klimas
SRS Natural Resource Trustee
National Oceanic and Atmospheric Administration
US EPA Waste Division

Mr. James H. Lee
Regional Environmental Officer
SRS Natural Resource Trustee
US Department of the Interior

Mr. Douglas L. Novak
SRS Natural Resource Trustee
South Carolina Office of the Governor

Mr. James Setser
Chief, Program Coordinator Branch
SRS Natural Resource Trustee
Department of Natural Resources

Dr. Paul A. Sandifer
Director
SC Department of Natural Resources
SRS Natural Resource Trustee

F. NATIVE AMERICAN GROUPS

The Honorable Gilbert Blue
Chairman
Catawba Indian Nation

The Honorable Bill Fife
Principal Chief
Muscogee (Creek) Nation

G. ENVIRONMENTAL AND PUBLIC INTEREST GROUPS

Mr. Joel Yudiken
Economist
Department of Public Policy
AFL-CIO

Ms. Susan Gordon
Program Director
Alliance for Nuclear Accountability

Ms. Kethy Crandell
Alliance for Nuclear Accountability

Ms. Karen Patterson
SRS Citizens Advisory Board

Mr. Alan Kuperman
Brookings Institute

Dr. Arjun Makhijani
President
Institute for Energy and Environmental Research

Dr. Mildred McClain
Citizens for Environmental Justice, Inc.

Mr. Paul Schwartz
National Campaigns Director
Clean Water Action

Mr. Gawain Kripke
Director Economics Program
Friends of the Earth

Mr. Tom Clements
Executive Director
Nuclear Control Institute

Mr. Damon Moglen
Greenpeace
Washington, D.C.

Dr. David Bradley
National Community Action Foundation

Mr. Robert Holden
Executive Director
National Congress of American Indians

Mr. Alex Echols
Deputy Director
National Fish and Wildlife Foundation

Ms. Betsy Merritt
Associate General Counsel
Department of Law & Public Policy
National Trust for Historic Preservation

Mr. Thomas F. Donnelly
Executive Vice President
National Water Resources Association

Mr. Steven Shimberg
Vice-President
National Wildlife Foundation

Dr. Thomas B. Cochran
Director, Nuclear Programs
Natural Resources Defense Council

Dr. Ed Lyman
Scientific Director
Nuclear Control Institute

Mr. Robert Musil, Ph.D.
Director of Security Programs
Physicians for Social Responsibility

Ms. Joy Oakes
Regional Staff Director
Appalachian Office
The Sierra Club

Mr. David Becker
The Sierra Club

Mr. Alden Meyer
Director of Arms Control Project
Union of Concerned Scientists

Ms. Diane Jackson
Administrative Assistant
Ecology and Economics Research Department
The Wilderness Society

H. OTHER GROUPS AND INDIVIDUALS

Mr. Peter Allan

Dr. Dave Amick
SAIC

Mr. Tom Anderson
Battelle

Ms. Jila Banaee
Lockheed-Martin Idaho Technologies Company

Mr. Sy Baron
MUSC

Ms. Sonya Barnette

Mr. James R. Barrett
B&W Services, Inc.

Colonel Mary Barton

Mr. Robert C. Baumback

Ms. Lisa Baxter
Georgia Technical College

Mr. W. Alton Bell, Jr.
Plumbers & Steamfitters Local Union #150

Mr. Charles T. Black

Mr. Edward P. Blanton, Jr.

Mr. Sam Booher

Mr. Edmund D. Boothe
Aiken Technical College

R. P. Borsody

Mr. Carlos W. Bowen

Ms. Sara Jo Braid

Mr. Dannion Brinkley
Mr. Bill Brizes

Ms. Elizabeth R. Brown
Charleston Deanery
South Carolina Council of Catholic Women

Mr. Ethan Brown

Mr. Ken Bulmahn

Ms. Donna Campbell
Foster Wheeler Environmental Corporation

Mr. Fred Campbell

Mr. Rich Campbell
Chem-Nuclear Systems

Mr. Roy Carter

Mr. George R. Caskey

Dr. Kailash Chandra

Mr. Ernie Chaput

Ms. Rebecca Charles
Tennessee Department of Environment and Conservation

Mr. Vladimir Y. Chechik
Shaw, Pitman, Potts, & Trowbridge

Mr. Carl E. Cliche

Mr. Leonard Collard

Ms. Marlena Conde
Edlow International Company

Mr. Steve Connor

Mr. John Cook

Mr. S. W. Corbett

Mr. Stephen Crump

Dr. Tim Devol
Clemson University
Environmental Systems Engineering Department

Mr. Sal Dimaria

Mr. John Dimarzio

Mr. John F. Doherty, J.D.

Mr. Dave Ecklund

Mr. Richard Engelmann
Waste Management Hanford

Ms. Lynne Fairobent

Ms. Rita Fellers
Department of Geography
University of North Carolina at Chapel Hill

Mr. Leverne P. Fernandez

Mr. Ken Fitch

Ms. Bonnie Fogdall
SAIC

Professor H. Paul Friesema
Institute for Policy and Research
Northwestern University

Mrs. Nadia Friloux
COGIMA Inc.

Mr. Richard Fry
Director, Division of Radiation Protection

Mr. Melvyn P. Galin

Mr. Ben Gannon

Mr. John Geddie

Colonel George A. Gibson
Mr. Robert Godfrey
Counselor (Nuclear)
Embassy of Australia

Mr. Anthony P. Gouge

Dr. Randall Guensler
School of Civil & Environmental Engineering
Georgia Institute of Technology

Mr. Robert Guild

Mr. Brandon Haddock
Augusta Chronicle

Mr. Jan Hagers

Mr. David Haines

Ms. Mary Hassell

Ms. Kathryn Hauer

Ms. Shelley Hawkins
Jacobs Engineering Group, Inc.

Mr. Warren Hills
Laborers Local 1137
AFL-CIO

Mr. C. C. Holcomb

Mr. Tom Houston

Mr. Robert A. Hollingsworth

Mr. Leonard Huesties

Mr. Charles E. Irvin

Mr. Cliff Jarman

Mr. Keith Johnson

Mr. Norman Kaish

Mr. Dan Kaplan

Mr. Roy Karimi

Mrs. Mary Kelly

Mr. Richard Kimmel

Mr. Ronald Knotts

Mr. Ron Koll
Waste Management Services

Mr. Larry Kripps

Mr. Paul Krzych
Dynamic Corporation

Miss Cynthia E. Lake

Mr. Dewey E. Large
Molten Metal Technology Inc. of TN

Mr. Bill Lawless

Mr. David Lechel

Mr. Thomas L. Lippert

Dr. William A. Lochstet
University of Pittsburgh at Johnstown Physics

Mr. Alastair J. MacDonald
UKAEA

Mr. Robert Maher

Mr. Steve Maheras

Dr. Gary Marshall
ES&H Program Control Manager
Argonne Medical Laboratory-West

Mr. Joseph A. Martillotti
Texas Department of Health
Bureau of Radiation Control

Mr. Bob Matthews

Ms. Elizabeth McBride

Ms. Trish McCracken

Dr. William R. McDonell

Mr. Michael F. McGowan
Geological Environmental Consultant

Ms. Dana McIntyre
WJBF-TV
Channel 6

Mr. Frank Metz

Ms. Louise M. Montgomery

Mr. Emment Moore
Washington State University

Mr. Kenneth J. Newcomer

Ms. Kim Newell
Public Information Director
SCDHEC

Mr. R. I. Newman

Mr. Matthew J. O'Connor
Mr. James L. Oliver

Mr. J. F. Ortaldo

Mr. Robert F. Overman

Mr. Aris Papadopoulous

Ms. Jean Pasquale

Dr. Ruth Patrick
Division of Limnology and Ecology
Academy of Natural Sciences of Philadelphia

Mr. Mark A. Petermann
Hydrogeologist
RMT, Inc.

Mr. Jeff Petraglia

Mr. George Piper

Mr. David Pittman

Mr. W. Lee Poe

Mr. Ron Pound
Environmental Projects
Newsletter

Mr. Richard H. Powell

Ms. Essie M. Richards
Carver Heights Community Org.

Ms. Dorene L. Richardson

Mr. Wayne Rickman
Sonalysts, Inc.

Mr. F. A. Riemann

Mr. Jacob Charles Robertson

Mr. Paul Robinson
Southwest Research & Information Center

Ms. Linda Rodgers

Ms. Connie Rogers

Mr. Edward Scalsky

Mr. Glenn R. Schlafer

Mr. Guy R. Selph

Dr. R. F. Shangraw, Jr.
Project Performance Corporation

Ms. Margaret Shekell
Ultra Systems Environmental

Mr. John O. Shipman

Ms. Kimberly Sizemore

Mr. Jim Skinner

Mr. Donald J. Skinner

Mr. Arthur H. Smith, Jr.

Mr. Don Solki
Carpenter's Local 283

Mr. Paul Stansbury
PNL

Mr. Jim Steinke
Newport News Shipbuilding Co.
Mr. Ed Stevens

Mr. Bill Stokes
Advanced Nuclear and Medical Systems

The Reverend Thomas A. Summers

Mr. Arthur Sutherland
Rogers & Associates Engineering Corporation

Ms. Lucy Swartz

Mr. Edward S. Syrjala

Dr. D. William Tedder
Associate Professor
School of Chemical Engineering
Georgia Institute of Technology

Mr. James W. Terry
Oak Ridge National Laboratory

Mr. Vincent Van Brunt
University of South Carolina
Chemical Engineering Department

Ms. Kathleen Gore
Exploration Resources

Mr. Alan Vaughan
Nuclear Fuel Services

Mr. Martin Vorum
Commodore Advanced Sciences, Inc.

Ms. Melissa Vrana
Project Performance Corporation

Mr. Jim Wanzeck

Mr. Payton H. Ward, Jr.
Ironworkers Local Union #709

Mr. Edgar West
Ironworkers Local Union #709

Mr. Frank S. Watters

Mr. Kim Welsch

Dr. F. Ward Whicker
Radiological Health Services
Colorado State University

Ms. Reba White
Teledyne Brown Engineering, Inc.

Ms. Pam Whitson
Oak Ridge Associated Universities

Mr. Patrick L. Whitworth

Mrs. Debbie Wilcox

Mr. Don J. Wilkes
Jacob Engineering Group

Mr. Jermetia L. Williams

Mr. Michael Witunski

Mr. Mel Woods

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GLOSSARY

Terms in this glossary are defined based on the context in which they are to be used in this EIS.

accident
: An unplanned sequence of events that results in undesirable consequences.

alpha-emitter
: A radioactive substance that decays by releasing an alpha particle.

alpha particle
: A positively charged particle consisting of two protons and two neutrons, that is emitted during radioactive decay from the nucleus of certain nuclides. It is the least penetrating of the three common types of radiation (alpha, beta, and gamma).

alpha waste
: Waste containing alpha-emitting transuranic radionuclides with activities between 10 and 100 nanocuries per gram.

alternative
: A major choice or strategy to address the EIS "Purpose and Need" statement, as opposed to the engineering options available to achieve the goal of an alternative.

annulus
: The space between the two walls of a double-wall tank.

applicable or relevant and appropriate requirements (ARARs)
: Requirements, including cleanup standards, standards of control, and other substantive environmental protection requirements and criteria for hazardous substances as specified under Federal and State law and regulations, that must be met when complying with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA).

aquifer
: A body of permeable rock, rock fragments, or soil through which groundwater moves.

as low as reasonably achievable (ALARA)
: A process by which a graded approach is applied to maintaining dose levels to workers and the public, and releases of radioactive materials to the environment at a rate that is as far below applicable limits as reasonably achievable.

atomic number
: The number of positively charged protons in the nucleus of an atom and the number of electrons on an electrically neutral atom.

background radiation
: Radiation from cosmic sources; naturally occurring radioactive materials, including radon (except as a decay product of source or special nuclear material), and global fallout as it exists in the environment from the testing of nuclear explosive devices.

backfill
: Material such as soil or sand used in refilling an excavation.

basemat
: The concrete and steel portion of the tank below the residual material and above the vadose zone.

beta-emitter
: A radioactive substance that decays by releasing a beta particle.

beta particle
: A charged particle emitted from a nucleus during radioactive decay, with a mass equal to 1/1837 that of a proton. A negatively charged beta particle is identical to an electron. A positively charged beta particle is called a positron.

beyond design basis accident (BDBA)
: An accident with an annual frequency of occurring between 1 in 1,000,000 and 1 in 10,000,000 ($1.0\times^{-6}$ and 1.0×10^{-7}).

biodiversity
: Pertains to the variety of life (e.g., plants, animals and other organisms) that inhabits a particular area or region.

blackwater stream
: Water in coastal plains, creeks, swamp, and/or rivers that has been imparted a dark or black coloration due to dissolution of naturally occurring organic matter from soils and decaying vegetation.

borosilicate
: A form of glass with silica sand, boric oxide, and soda ash.

borrow material
: Material such as soil or sand that is removed from one location and used as fill material in another location.

bounding accident
: A postulated accident that is defines to encompass the range of anticipated accidents and used to evaluate the consequences of accidents at facilities. The most conservative parameters (e.g., source terms, and meteorology) applied to a conservative accident resulting in a bounding accident analysis.

cancer
: The name given to a group of diseases characterized by uncontrolled cellular growth.

canister
: A container (generally stainless steel) into which immobilized radioactive waste is placed and sealed.

capable fault
: In part, a capable fault is one that may have had movement at or near the ground surface at least once within the past 35,000 years, or has had recurring movement within the past 500,000 years. Further definition can be found in 10 CFR 100, Appendix A.

carcinogen
: A radionuclide or nonradiological chemical that has been proven or suspected to be either a promoter or initiator of cancer in humans or animals.

characterization
: The determination of waste composition and properties, whether by review of process knowledge, nondestructive examination or assay, or sampling and analysis, generally done for the purpose of determining appropriate storage, treatment, handling, transport, and disposal requirements.

chronic exposure
: The absorption of hazardous material (or intake of hazardous materials) over a long period of time (for example, over a lifetime).

Code of Federal Regulations (CFR)
: A document containing the regulations of Federal executive departments and agencies.

collective effective dose equivalent
: Sum of the effective dose equivalents for individuals composing a defined population. The units for this are person-rem or person-sievert.

committed dose equivalent
: Total dose equivalent accumulated in an organ or tissue in the 50 years following a single intake of radioactive materials into the body.

committed effective dose equivalent
: The sum of committed radiological dose equivalents to various tissues in the body, each multiplied by the appropriate weighing factor and expressed units of rem.

condensate
: Liquid that results from condensing a gas by cooling below its saturation temperature.

confining (unit)
: A rock layer (or stratum) having very low hydraulic conductivity (or permeability) that restricts the movement of groundwater either into or out of adjacent aquifers.

contaminant
: Any gaseous, chemical or organic material that contaminates (pollutes) air, soil, or water. This term also refers to any hazardous substance that does not occur naturally or that occurs at levels greater than those naturally occurring in the surrounding environment (background).

contamination
: The deposition of unwanted radioactive material on the surfaces of structures, areas, objects, or personnel.

critical
: A condition where in uranium, plutonium or tritium is capable of sustaining a nuclear chain reaction.

criticality
: State of being critical. Refers to a self-sustaining nuclear chain reaction in which there is an exact balance between the production of neutrons and the losses on neutrons in the absence of extraneous neutron sources.

curie (CI)

The basic unit used to describe the intensity of radioactivity in a sample of material. he curie is equal to 37 billion disintegrations per second, which is approximately the rate of decay of 1 gram of radium. A curie is also a quantity of any radionuclide that decays at a rate of 37 billion disintegrations per second.

decay, radioactive

The decrease in the amount of any radioactive material with the passage of time, due to the spontaneous emission from the atomic nuclei of either alpha or beta particles, often accompanied by gamma radiation (see half-life, radioactive).

decommissioning

The process of removing a facility from operation followed by decontamination, entombment, dismantlement, or conversion to another use.

decontamination

The actions taken to reduce or remove substances that pose a substantial present or potential hazard to human health or the environment, such as radioactive contamination from facilities, soil, or equipment by washing, chemical action, mechanical cleaning, or other techniques.

design basis accident (DBA)

For nuclear facilities, a postulated abnormal event that is used to establish the performance requirements of structures, systems, and components that are necessary to maintain them in a safe shutdown condition indefinitely or to prevent or mitigate the consequences so that the general public and operating staff are not exposed to radiation in excess of appropriate guideline values.

design basis earthquake

The maximum intensity earthquake that might occur along the nearest fault to a structure. Structures are built to withstand a design basis earthquake.

DOE Orders

Requirements internal to the U.S. Department of Energy (DOE) that establish DOE policy and procedures, including those for compliance with applicable laws.

dosage

The concentration-time profile for exposure to toxicological hazards.

dose (or radiation dose)

A generic term that means absorbed dose, dose equivalent, effective dose equivalent, committed dose equivalent, committed effective dose equivalent, or total effective dose equivalent, as defined elsewhere in this glossary.

dose equivalent

Product of the absorbed dose, the quality factor, and any other modifying factors. The dose equivalent is a quantity for comparing the biological effectiveness of different kinds of radiation on a common scale. The unit of dose equivalent is the rem. A millirem is one one-thousandth of a rem.

effective dose equivalent (EDE)
: The sum of the products of the dose equivalent to the organ or tissue and the weighting factors applicable to each of the body organs or tissues that are irradiated. It includes the dose from radiation sources internal and/or external to the body and is expressed in units of rem. The International Commission on Radiation Protection defines this as the effective dose.

effluent
: Liquid or gaseous waste streams released from a facility.

effluent monitoring
: Sampling or measuring specific liquid or gaseous effluent streams for the presence of pollutants.

endemic
: Native to a particular area or region.

environmental restoration
: Cleanup and restoration of sites and decontamination and decommissioning of facilities contaminated with radioactive and/or hazardous substances during past production, accidental releases, or disposal activities.

environmental restoration program
: A DOE subprogram concerned with all aspects of assessment and cleanup of both contaminated facilities in use and of sites that are no longer a part of active operations. Remedial actions, most often concerned with contaminated soil and groundwater, and decontamination and decommissioning are responsibilities of this program.

evaporator
: A facility that mechanically reduces the water contents in tank waste to concentrate the waste and reduce storage space needs.

exposure pathways
: The course a chemical or physical agent takes from the source to the exposed organism. An exposure pathway describes a unique mechanism by which an individual or population is exposed to chemicals or physical agents at or originating from a release site. Each exposure pathway includes a source or release from a source, an exposure point, and an exposure route. If the exposure point differs from the source, a transport/exposure medium such as air or water is also included.

external accident (or initiator)
: An accident that is initiated by manmade energy sources not associated with operation of a given facility. Examples include airplane crashes, induced fires, transportation accidents adjacent to a facility, and so forth.

facility basemat
: For this purposes of this EIS, basemat is defined as the concrete pad beneath the HLW tank.

fissile material
: Any material fissionable by thermal (slow) neutrons. The three primary fissile materials are uranium-233, uranium-235, and plutonium-239.

floodplain
: The level area adjoining a river or stream that is sometimes covered by flood water.

gamma-emitter
: A radioactive substance that decays by releasing gamma radiation.

gamma ray (gamma radiation)
: High-energy, short wavelength electromagnetic radiation (a packet of energy) emitted from the nucleus. Gamma radiation frequently accompanies alpha and beta emissions and always accompanies fission. Gamma rays are very penetrating and are best stopped or shielded against by dense materials, such as lead or uranium. Gamma rays are similar to x-rays, but are usually more energetic.

geologic repository
: A deep (on the order of 600 meter [1,928 feet] or more) underground mined array of tunnels used for permanent disposal of radioactive waste.

groundwater
: Water occurring beneath the earth's surface in the intervals between soil grains, in fractures, and in porous formations.

grout
: A fluid mixture of cement-like materials and liquid waste that sets up as a solid mass and is used for waste fixation, immobilization, and stabilization purposes.

habitat
: The sum of environmental conditions in a specific place occupied by animals, plants, and other organisms.

half-life
: The time in which half the atoms of a particular radioactive substance disintegrate to another nuclear form. Measured half-lives vary from millionths of a second to billions of years. Also called physical half-life.

hazard index
: The sum of several hazard quotients for multiple chemicals and/or multiple exposure pathways. A hazard index of greater than 1.0 is indicative of potential adverse health effects. Health effect could be minor temporary effects or fatal, depending on the chemical and amount of exposure.

hazard quotient
: The ratio of an exposure level to a substance to a toxicity reference value selected for risk assessment purposes.

hazardous chemical
: A term defined under the Occupational Safety and Health Act and the Emergency Planning and Community Right-to-Know Act as any chemical that is a physical hazard or a health hazard.

hazardous material
: A substance or material, including a hazardous substance, which has been determined by the U.S. Secretary of Transportation to be capable of posing an unreasonable risk to health, safety, and property when transported in commerce.

hazardous substance

Any substance that when released to the environment in an uncontrolled or unpermitted fashion becomes subject to the reporting and possible response provisions of the Clean Water Act and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

hazardous waste

Under the Resource Conservation and Recovery Act, a solid waste, or combination of solid wastes, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may (a) cause, or significantly contribute to an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or (b) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed. Source, special nuclear material, and by-product material, as defined by the Atomic Energy Act, are specifically excluded from the definition of solid waste.

heavy metals

Metallic elements with high atomic weights (for example, mercury, chromium, cadmium, arsenic, and lead) that can damage living things at low concentrations and tend to accumulate in the food chain.

high-efficiency particulate air (HEPA) Filter

A filter with an efficiency of at least 99.95 percent used to separate particles from air exhaust streams prior to releasing that air into the atmosphere.

high-level waste

As defined by the Nuclear Waste Policy Act [42 U.S. C. 10101], High Level Waste means (a) the highly radioactive waste material resulting from the reprocessing of spent nuclear fuel, including liquid waste produced directly in reprocessing and any solid material derived from such liquid that contains [a combination of transuranic and] fission products [nuclides] in sufficient concentrations; and (b) other highly radioactive material that the [U.S. Nuclear Regulatory] Commission, consistent with existing law, determines by rule requires permanent isolation.

hydrology

The study of water, including groundwater, surface water, and rainfall.

immobilization

A process (e.g., grouting or vitrification) used to stabilized waste. Stabilizing the waste inhibits the release of waste to the environment.

inadvertent intrusion

The inadvertent disturbance of a disposal facility or its immediate environment by a potential future occupant that could result in loss of containment of the waste or exposure of personnel. Inadvertent intrusion is a significant consideration that shall be included either in the design requirements or waste acceptance criteria of a waste disposal facility.

incidental waste

Wastes that are not defined as high-level waste (i.e., originating from nuclear fuel processing).

inhibited water

Water to which sodium hydroxide has been added to inhibit corrosion.

in situ

A Latin term meaning “in place.”

institutional control

The control of waste disposal sites or other contaminated sites by human institutions in order to prevent or limit exposures to hazardous materials. Institutional control may be accomplished by (1) active control measures, such as employing security guards and maintaining security fences to restrict site access, and (2) passive control measures, such as using physical markers, deed restrictions, government regulations, and public records and archives to preserve knowledge of the site and prevent inappropriate uses.

internal accidents

Accidents that are initiated by man-made energy sources associated with the operation of a given facility. Examples include process explosions, fires, spills, criticalities, and so forth.

involved worker

Workers that would be involved in a proposed action as opposed to workers that would be on the site of a proposed action but not involved in the action.

isotope

One of two or more atoms with the same number of protons, but different numbers of neutrons, in their nuclei. Thus, carbon-12, carbon-13, and carbon-14 are isotopes of the element carbon, the numbers denoting the approximate atomic weights. Isotopes have very nearly the same chemical properties, but often different physical properties (for example, carbon-12 and -13 are stable, carbon-14 is radioactive).

latent cancer fatality

A fatality resulting from cancer caused by an exposure to a known or suspected radionuclide or carcinogenic chemical.

low-level waste (LLW)

Waste that contains radioactivity and is not classified as high-level waste, transuranic waste, or spent nuclear fuel, or byproduct tailings containing uranium or thorium from processed ore (as defined in Section II e(2) of the Atomic Energy Act).

low-level mixed waste (LLMW)

Waste that contains both hazardous waste under the Resource Conservation and Recovery Act and source, special nuclear, or by-product material subject to the Atomic energy Act of 1954 (42 USC 2011, *et seq.*).

macroinvertebrate

Small animal, such as a larval aquatic insect, that is visible to the naked eye and has no vertebral column.

maximally exposed individual (MEI)

A hypothetical individual defined to allow dose or dosage comparison with numerical criteria for the public. This individual is located at the point on the DOE site boundary nearest to the facility in question.

millirad

One thousandth of a rad (see rad).

millirem

One thousandth of a rem (see rem).

mixed waste
: Waste that contains both hazardous wastes under the Resource Conservation and Recovery Act and source, special nuclear, or by-product material subject to the Atomic Energy Act of 1954.

nanocurie
: One billionth of a curie (see curie).

natural phenomena accidents
: Accidents that are initiated by phenomena such as earthquakes, tornadoes, floods, and so forth.

noninvolved workers
: Workers in a fixed population outside the day-to-day process safety management controls of a given facility area. In practice, this fixed population is normally the workers at an independent facility area located a specific distance (often 100 meters) from the reference facility area.

nuclear criticality
: A self-sustaining nuclear chain reaction.

nuclide
: A general term referring to all known isotopes, both stable (279) and unstable (about 5,000), of the chemical elements.

offsite
: Away from the SRS site.

offsite population
: For facility accident analyses, the collective sum of individuals located within an 80-kilometer (50-mile) radius of a facility and within the path of the plume with the wind blowing in the most populous direction.

oxalic acid
: A water soluble organic acid, $H_2C_2O_4$, being considered as a cleaning agent to use in spray-washing tanks because it dissolves sludge and is only moderately aggressive against carbon steel, the material used in the construction of the waste tanks.

particulate
: Pertains to minute, separate particles. An example of dry particulate is dust.

performance objectives
: Parameters within which a facility must perform to be considered acceptable.

permanent disposal
: For high level waste the term means emplacement in a repository for high-level radioactive waste, spent nuclear fuel, or other highly radioactive material with no foreseeable intent of recovery, whether or not such emplacement permits the recovery of such waste.

permeability
: The degree of ease with which water can pass through a rock or soil.

person-rem
: A unit used to measure the radiation exposure to an entire group and to compare the effects of different amounts of radiation on groups of people. It is obtained by multiplying the average dose equivalent (measured in rems) to a given organ or tissue by the number of persons in the population of interest.

pH
: A measure of the relative acidity or alkalinity of a solution. A neutral solution has a pH of 7, acids have a pH of less than 7, and bases have a pH of greater than 7.

picocurie
: One trillionth of a curie (see curie).

pollutant migration
: The movement of a contaminant away from its initial source.

population
: For risk assessment purposes, population consists of the total potential members of the public or workforce who could be exposed to a possible radiation or chemical dose from an exposure to radionuclides or carcinogenic chemicals.

population dose
: The overall dose to the offsite population.

rad
: The special unit of absorbed dose. One rad is equal to an absorbed dose of 100 ergs/gram.

radiation (ionizing radiation)
: Alpha particles, beta particles, gamma rays, x-rays, neutrons, high-speed electrons, high-speed protons, and other particles capable of producing ions. Radiation, as it is used here, does not include nonionizing radiation such as radio- or microwaves, or visible, infrared, or ultraviolet light.

radiation worker
: A worker who is occupationally exposed to ionizing radiation and receives specialized training and radiation monitoring devices to work in such circumstances.

radioactive waste
: Waste that is managed for its radioactive content.

radioactivity
: The property or characteristic of material to spontaneously "disintegrate" with the emission of energy in the form of radiation. The unit of radioactivity is the curie (or becquerel).

radioisotope
: An unstable isotope of an element that decays or disintegrates spontaneously, emitting radiation. approximately 5,000 natural and artificial radioisotopes have been identified.

radionuclide
: The radioisotopes that together comprise 95 percent of the total curie content of a waste package by volume and have a half-life of at least 1 week. Radionuclides that are important to a facility's radiological performance assessment and/or a safety analysis and are listed in the facility's waste acceptance criteria are considered major radionuclides.

Record of Decision (ROD)
: A public document that records the final decision(s) concerning a proposed action.

reducing grout
: A grout formulated to behave as a chemical reducing agent. A chemical reducing agent is a substance that reduces other substances (i.e., decreases their positive charge or valence) by supplying electrons. The purpose of a reducing grout in closure of the high-level waste tanks would be to provide long-term chemical durability against leaching of the residual waste by water. Reducing grout would be com

  posed primarily of cement, blast furnace slag, masonry sand, and silica fume.

rem
: A unit of radiation dose that reflects the ability of different types of radiation to damage human tissues and the susceptibility of different tissues to the damage. Rems are a measure of effective dose equivalent.

risk
: Quantitative expression of possible loss that considers both the probability that a hazard causes harm and the consequences of that event.

Safety Analysis Report (SAR)
: A report, prepared in accordance with DOE Orders 5481.1B and 5480.23, that summarize the hazards associated with the operation of a particular facility and defines minimum safety requirements.

saltcake
: Salt compounds that have crystallized as a result of concentrating the liquid.

saltstone
: Concrete-like substance formed when the low-activity fraction of high-level waste is mixed with cement, flyash, and slag.

seepline
: An area where subsurface water or groundwater emerges from the earth and slowly flows overland.

segregation
: The process of separating (or keeping separate) individual waste types and/or forms in order to facilitate their cost-effective treatment and storage or disposal.

seismicity
: The phenomenon of earth movements; seismic activity. Seismicity is related to the location, size, and rate of occurrence of earthquakes.

sludge
: Solid material that precipitates or settles to the bottom of a tank.

solvent
: Substance (usually liquid) capable of dissolving one or more other substances.

source material
: (a) Uranium, thorium, or any other material that is determined by the U.S. Nuclear Regulatory Commission pursuant to the provisions of the Atomic Energy Act of 1954, Section 61, to be source material; or (b) ores containing one or more of the foregoing materials, in such concentration as the U.S. Nuclear Regulatory Commission may by regulation determine from time-to-time [Atomic Energy Act 11(z)]. Source material is exempt from regulation under to Resource Conservation and Recovery Act.

source term (Q)
: the quantity of radioactive material released by an accident or operation that causes exposure after transmission or deposition. Specifically, it is that fraction of respirable material at risk (MAR) that is released to the atmosphere from a specific location. The source term defines the initial condition for subsequent dispersion and consequence evaluations. Q = material at risk (MAR) damage ration (DR) x airborne release fraction (ARF) x respirable fraction (RF) x leak path factor (LPF). The units of Q are quantity at risk averaged over the specified time duration.

spent nuclear fuel
: Fuel that has been withdrawn from a nuclear reactor following irradiation, the constituent elements of which have not been separated.

stabilization
: Treatment of waste to protect the environment from contamination. This includes rendering a waste immobile or safe for handling and disposal.

subsurface
: The area below the land surface (including the vadose zone and aquifers).

tank farm
: An installation of multiple adjacent tanks, usually interconnected for storage of liquid radioactive waste.

total effective dose equivalent
: The sum of the external dose equivalent (for external exposures) and the committed effective dose equivalent (for internal exposures).

transuranic waste
: Waste containing more than 100 nanocuries of alpha-emitting transuranic isotopes, with half-lives greater than 20 years, per gram of waste, except for (a) high-level radioactive waste; (b) waste that the U.S. Department of Energy has determined, with the concurrence of the Administrator of the U.S. Environmental Protection Agency, does not need the degree of isolation required by 40 CFR 191; or (c) waste that the U.S. Nuclear Regulatory Commission has approved for disposal on a case-by-case basis in accordance with 10 CFR 61.

treatment
: Any activity that alters the chemical or physical nature of a hazardous waste to reduce its toxicity, volume, mobility or to render it amenable for transport, storage or disposal.

vadose zone
: The zone between the land surface and the water table. Saturated bodies, such as perched groundwater, may exist in the vadose zone. Also called the zone of aeration and the unsaturated zone.

vitrification
: A method of immobilizing waste (e.g., radioactive, hazardous, and mixed). This involves adding frit and waste to a joule-heated vessel and melting the mixture into a glass. The purpose of this process is to permanently immobilize the waste and to isolate it from the environment.

volatile organic compound (VOC)
: Compounds that readily evaporate and vaporize at normal temperatures and pressures.

waste minimization
: An action that economically avoids or reduces the generation of waste by source reduction, reducing the toxicity of hazardous waste, improving energy usage, or recycling. These actions will be consistent with the general goal of minimizing present and future threats to human health, safety, and the environment.

waste stream
: A waste or group of wastes with similar physical form, radiological properties, U. S. Environmental Protection Agency waste codes, or associated land disposal restriction treatment standards. It may be the result of one or more processes or operations.

wetlands
: Area that are inundated or saturated by surface water or groundwater and that typically support vegetation adapted for life in saturated soils. Wetlands generally include swamps, marshes, bogs, and similar areas.

wind rose
: A star-shaped diagram showing how often winds of various speeds blow from different directions. This is usually based on yearly average.